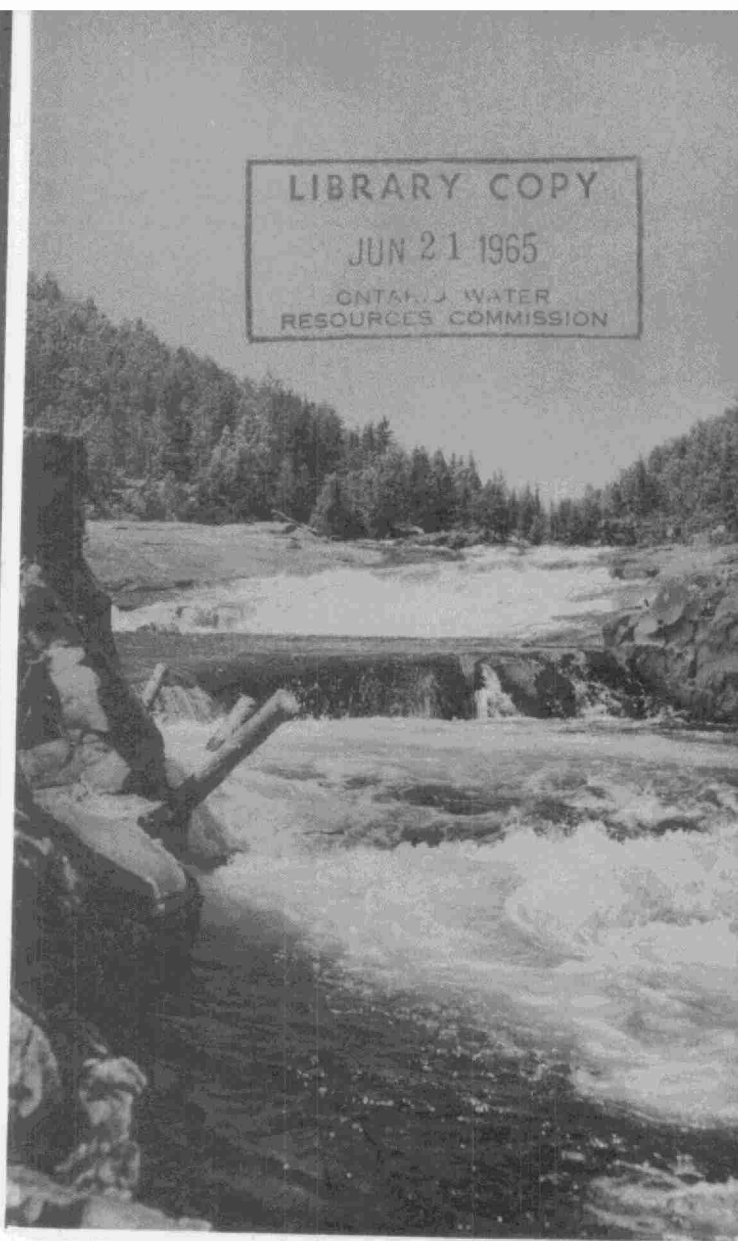


*Streetsville
Sewage
Treatment
Plant*

1963 Annual Report

Ontario Water Resources Commission



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ONTARIO WATER RESOURCES COMMISSION
OFFICE OF THE GENERAL MANAGER

Mayor and Members of Council,
Town of Streetsville.

Gentlemen

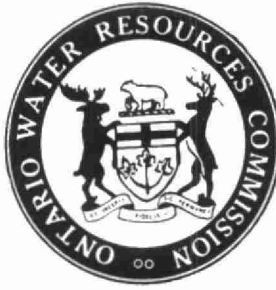
I am pleased to submit, for your information, the 1963 Annual Operating Report of the Streetsville Sewage Treatment plant, OWRC Project No. 57-S-5, which has been prepared by our Division of Plant Operations.

We are grateful for the kind cooperation which you and your staff have extended to our Operations staff throughout the year. We look forward to a continuing close association with you in our mutual endeavour to control pollution.

Yours very truly,

A handwritten signature in dark ink, appearing to read "D. S. Caverly", is written over the typed name.

D. S. Caverly,
General Manager



General Manager,
Ontario Water Resources Commission.

Dear Sir:

It is with pleasure that I present to you the Annual Report of the operation of the Streetsville Sewage Treatment Plant, OWRC Project No. 57-S-5 for 1963.

This report presents design data, outlines operating problems encountered and summarizes in tables, charts and graphs all significant flow and cost data.

Yours very truly,

B. C. Palmer,
Director,
Division of Plant Operations

foreword



This report is designed to present the highlights of the operation of these works during 1963. Trends in flows and other operating data can be extremely

useful in the development of necessary long range enlargement and improvement programs.

In addition to the activities reported herein, much unrecorded effort has contributed to the success of this operation. The municipality, through representatives on the Local Advisory Committee, has given valuable assistance in reviewing salary schedules, detailed operating budgets, personnel problems, flow patterns, and major maintenance problems.

The Division of Plant Operations has provided direction to the field staff in administrative procedures, quality control, maintenance schedules, equipment inspection and purchase supervision. A number of other Divisions of the Commission have been of service. The Division of Construction has offered helpful advice on equipment selection and renovation problems. The Division of Sanitary Engineering has maintained, through its District Engineering staff, a keen interest in the operation and has made a number of constructive recommendations. Its operator training courses have been very helpful. The Division of Finance has processed many payrolls, purchase orders and invoices dealing directly with this project. The Commission Personnel Director has been most helpful in the selection of new staff.

The excellent cooperation of all of these groups is gratefully acknowledged.

A handwritten signature in cursive script, reading "B. C. Palmer".

B. C. Palmer,
Director,
Division of Plant Operations



DIVISION OF PLANT OPERATIONS

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C. W. Perry
Assistant Director
A. C. Beattie
Regional Supervisor
A. Clark
Operations Engineer

STREETSVILLE SEWAGE TREATMENT PLANT

OPERATED FOR

THE TOWN OF STREETSVILLE

BY

THE ONTARIO WATER RESOURCES COMMISSION

CHAIRMAN

A. M. Snider

COMMISSIONERS

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J. H. H. Root, M. P. P.

J. A. Vance, LL. D.

A. A. Wishart, Q. C., M. P. P.

GENERAL MANAGER

D. S. Caverly

ASSISTANT GENERAL MANAGERS

G. M. Galimbert
L. E. Owers

COMMISSION SECRETARY

W. S. MacDonnell

1956_{to} 1963 History

In 1956 the Village of Streetsville and the Ontario Water Resources Commission initiated plans for the construction of a modern sewage treatment plant. The firm of Proctor and Redfern Limited of Toronto Ontario, was engaged to prepare plans and specifications for the project.

APPROVAL

On December 6th, 1959 the municipality signed an agreement with the Ontario Water Resources Commission to finance, construct and operate a sewage treatment plant.

CONSTRUCTION

Tret Construction Company was awarded the contract and the project was started November 12th, 1957 and completed November 13th, 1958. The official opening was held on June 27th, 1959.

TOTAL COST

The total cost of the project was \$310,937.98.

Project Staff

Richard Dadd
Chief Operator

The Chief Operator of the plant is Richard Dadd. Mr. Dadd has been in charge of the plant since 1959 taking over from the previous operator Robert Church.

He has been assisted during the summer by a casual labourer R. Jess.

The plant has been operated to the satisfaction of the Division of Plant Operations.

Description of Project

SEWAGE COLLECTION SYSTEM

The sewage is collected by a system of separate sanitary sewers, , including four pumping stations, and enters the treatment plant by gravity through two 12-inch and one 8-inch diameter cast iron inverted siphons.

These inverted siphons discharge to a common manhole at the north side of the plant site which is connected to the influent works by a 14-inch diameter cast iron pipe.

INFLUENT WORKS

The flow upon entering the influent works may be split allowing excess flow to be diverted to the old settling tank. From this tank it flows to the chlorine contact chamber where it is chlorinated and then discharged to the Credit River.

For normal flows, however, the sewage passes through one of two manually cleaned bar screens where twigs and rags are removed, then through one of the two manually cleaned grit chamber channels. Both of these channels terminate with a proportional weir which maintains a constant velocity through the grit chambers of one foot per second. These chambers have been designed to operate one at a time so that the other can be cleaned in readiness for operation.

From the grit chamber channels the sewage passes through a Parshall flume, allowing the sewage entering the plant to be measured.

From the flume, the sewage enters the last chamber of the influent works, into which the 6 inch supernatant line from the digester discharges. The combined raw sewage and supernatant flows then pass through a 12 inch diameter cast iron pipe to the influent well of the primary clarifier. This 12-inch C.L. feed line is valved so that the sewage can either pass to the primary clarifier, by-pass the clarifier going direct to the aeration tanks, or by-pass the plant completely and flow to the chlorination chamber.

PRIMARY SEDIMENTATION TANK

There is one primary clarifier 25 ft. square which retains the sewage for 2.3 hours at design flow. This detention period is sufficient to allow approximately 50% of the suspended solids to settle out to the bottom. There is also a skimming mechanism which conveys surface scum and grease to a scum pit and it, together with the sludge, settled out in the bottom of the clarifier, is then pumped to the digester.

AERATION

Settled sewage from the primary clarifier flows to the aeration section where it is mixed with activated sludge which is returned from the final sedimentation tanks.

The aeration tank retains the sewage for a period of 6 hours at design flow plus 25% return sludge. This allows the biological environment sufficient time to remove the finely divided, suspended and dissolved organic material remaining in the flow.

The settled sludge (activated sludge) from the final sedimentation tank is recirculated back to the aeration tanks and mixes with the incoming effluent from the primary sedimentation tank.

This mixed liquid is then aerated by air supplied from compressors. The air supplied provides the oxygen requirements of the biological communities of aerobic micro-organisms (mixed liquor sludge floc) and also produces a roll which prevents settling in the tanks. The activated sludge which is returned acts as the vehicle for the bacteria which in turn oxidizes the organic material contained in the sewage.

FINAL SEDIMENTATION TANK

The final sedimentation tank provides a detention period of 2.4 hours which is sufficient to allow the activated sludge to settle out. The activated sludge which is settled out in the final tank is returned to the aeration tank and provides a continuous environment for the maintenance of floc in the tank. Excess sludge is wasted, being pumped to the digester.

After final settling, the effluent overflows the weir to a chlorine contact chamber where it is chlorinated and then discharged to the Credit River.

DIGESTION

There is a single digester at the Streetsville plant. Sludge from the primary tank is pumped, with excess activated sludge, to this tank where, in the absence of air and in a regulated temperature of 90° F., the decomposing or digestion process beings.

The raw sludge when broken down by anaerobic bacterial action and thoroughly digested is a thick, dark liquid.

The digested sludge is then disposed of by placing it on drying beds or by truck haulage.

Sludge gas formed during the process is used as fuel for the heat exchanger supplying heat to the digester.

CHLORINATION

The effluent prior to discharge to the Credit River is chlorinated and retained in a chlorine contact chamber for approximately 20 minutes. Facilities are adequate to supply chlorine at a rate of 200 pounds per 24 hours.

Design—Data

GENERAL

Type of Plant - Activated sludge.

Design Population - 8,000 persons.

Design Plant Flow - 800,000 gallons per day.

Per Capita Flow - 100 gallons

Five Day BOD -

Raw Sewage	-	240 PPM
------------	---	---------

Removal	-	90-95%
---------	---	--------

Suspended Solids -

Raw Sewage	-	260 PPM
------------	---	---------

Removal	-	90%
---------	---	-----

PRIMARY TREATMENT

Influent Sewers

Two 12 inch and one 8 inch sewer connected to the influent works by a 14 inch diameter cast iron pipe.

Screening

Two manually cleaned bar screens.

Grit Removal

Two grit removal channels, detention provided 0.43 minutes at design flow.

PRIMARY SEDIMENTATION TANK

One Dorr-Oliver-Long - 35 ft. square by 10 ft. deep.

Detention Time - 2.3 hours.

Surface Settling Rate - 650 gallons per square ft. of tank per day.

Overflow Rate - 6250 gallons per lineal ft. of weir per day.

SECONDARY TREATMENT

Aeration Tanks

Two single pass tanks each 104 ft. x 17 ft. x 12 ft.

Detention Time - 6.1 hours at design flow plus 25% return sludge.

Air Supply to Tanks - Each tank has 24 separately valved banks of general filtration and engineering's Flo Rite air diffuser assemblies (total 96).

Air Blowers - Two rotary positive blowers rated at 760 cfm each.
Air supply 1.2 cubic ft. per gallon at design flow.

SECONDARY SEDIMENTATION

One Dorr-Oliver-Long - 40 ft. square

Detention Time - 2.4 hours.

Surface Settling Rate - 625 gallons per square ft. of tank per day.

Overflow Rate - 5400 gallons per lineal ft. of weir per day.

DIGESTER

One tank - 45 ft. diameter by 26 1/2 ft. liquor depth.

Capacity - 4.5 cubic ft. per capita.

Loading - 1.5 pounds solids per cubic ft. tank per month.

SLUDGE BEDS

Two beds 50 ft. x 100 ft.

Total area - 10,000 square ft.

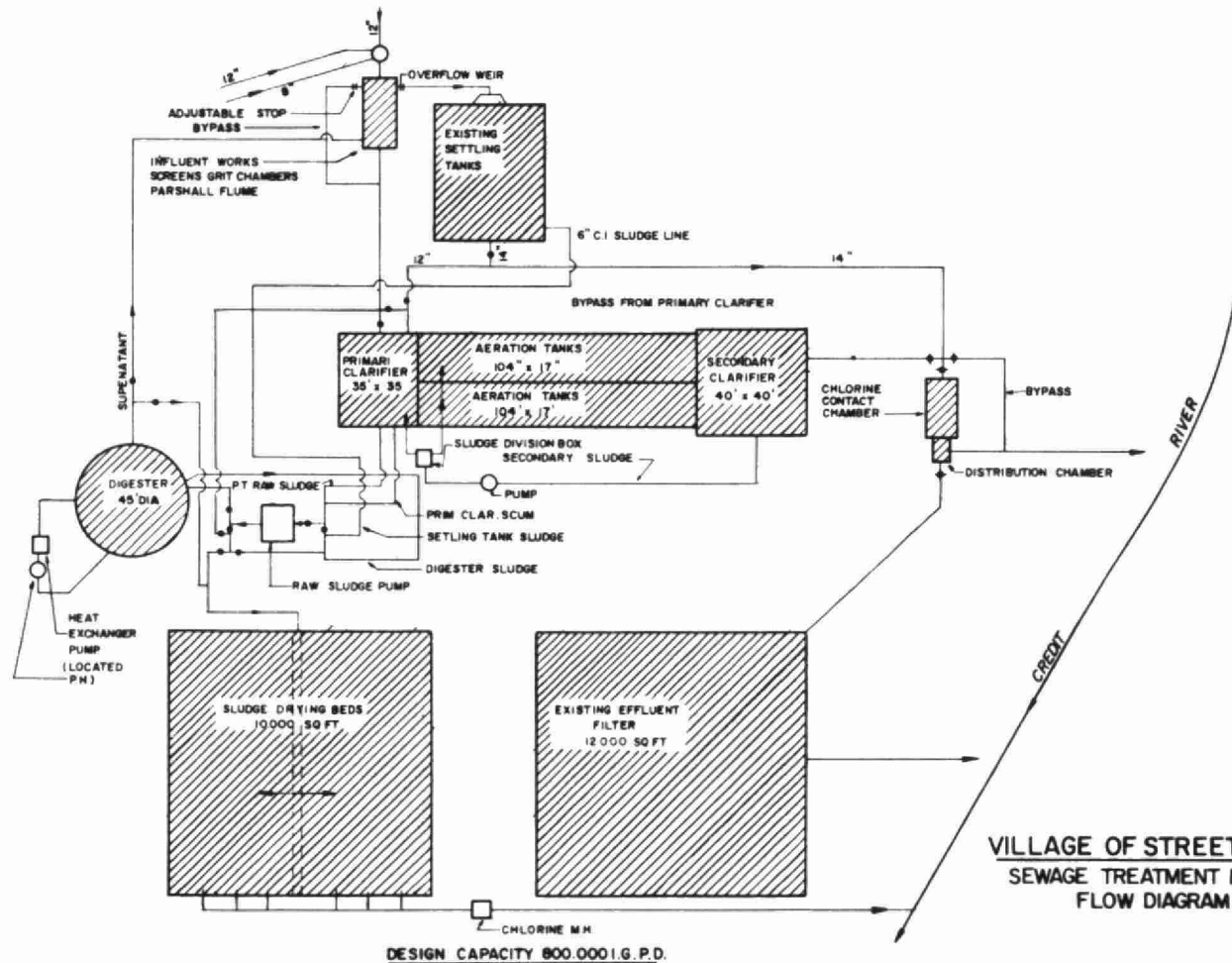
CHLORINATION

Contact chamber providing 20 minutes detention.

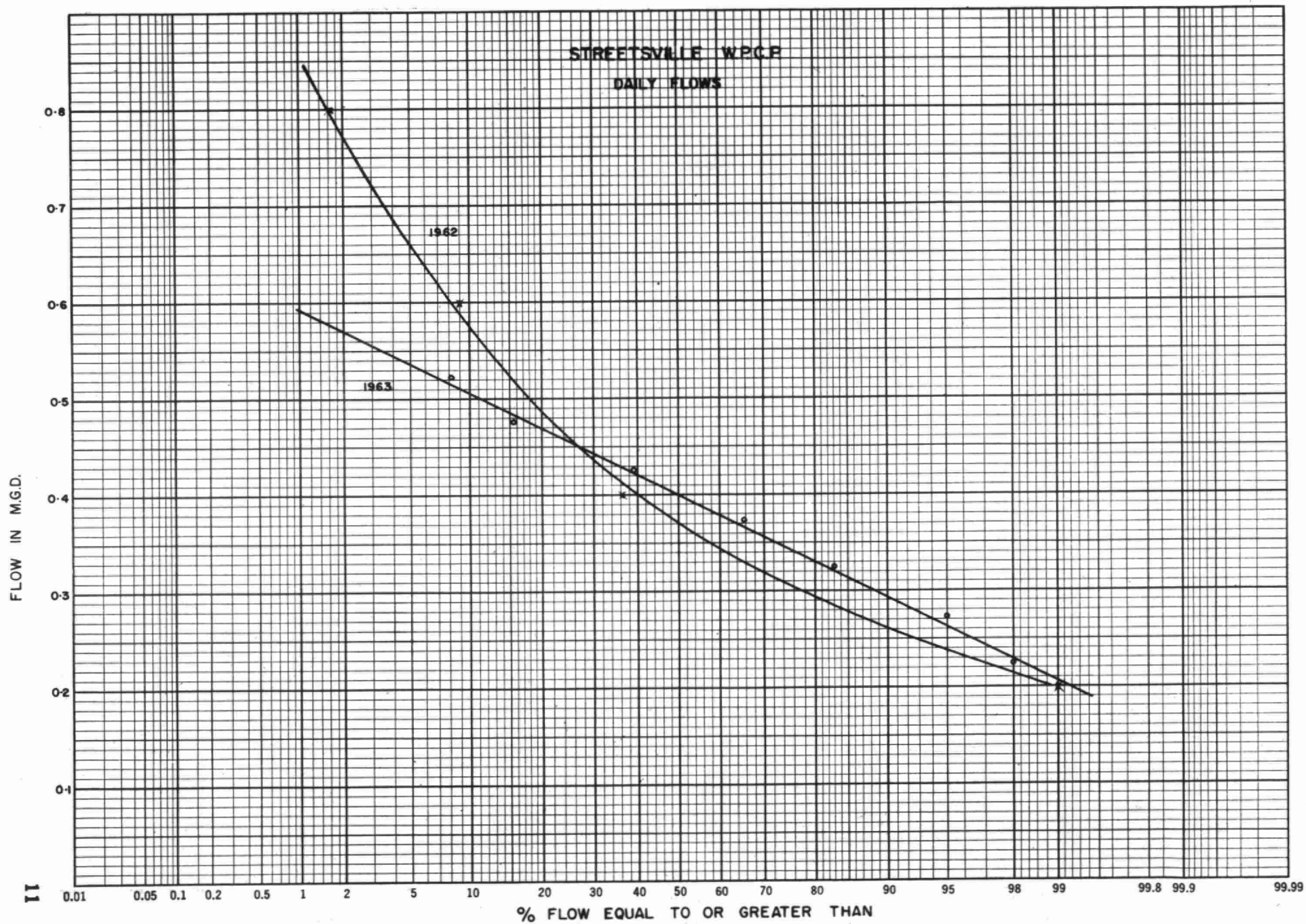
Capacity 200 pounds chlorine per 24 hours.

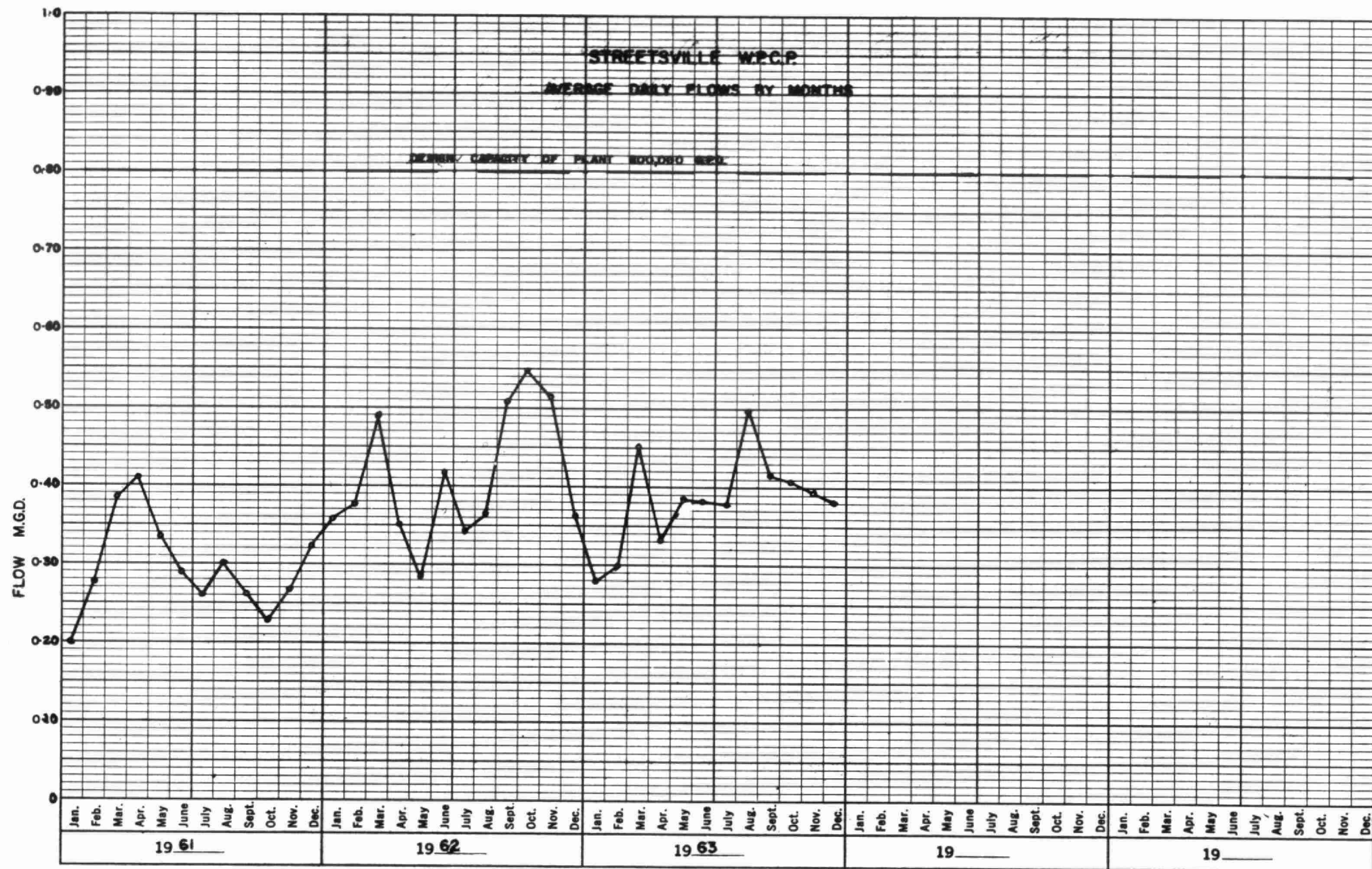
FLOW

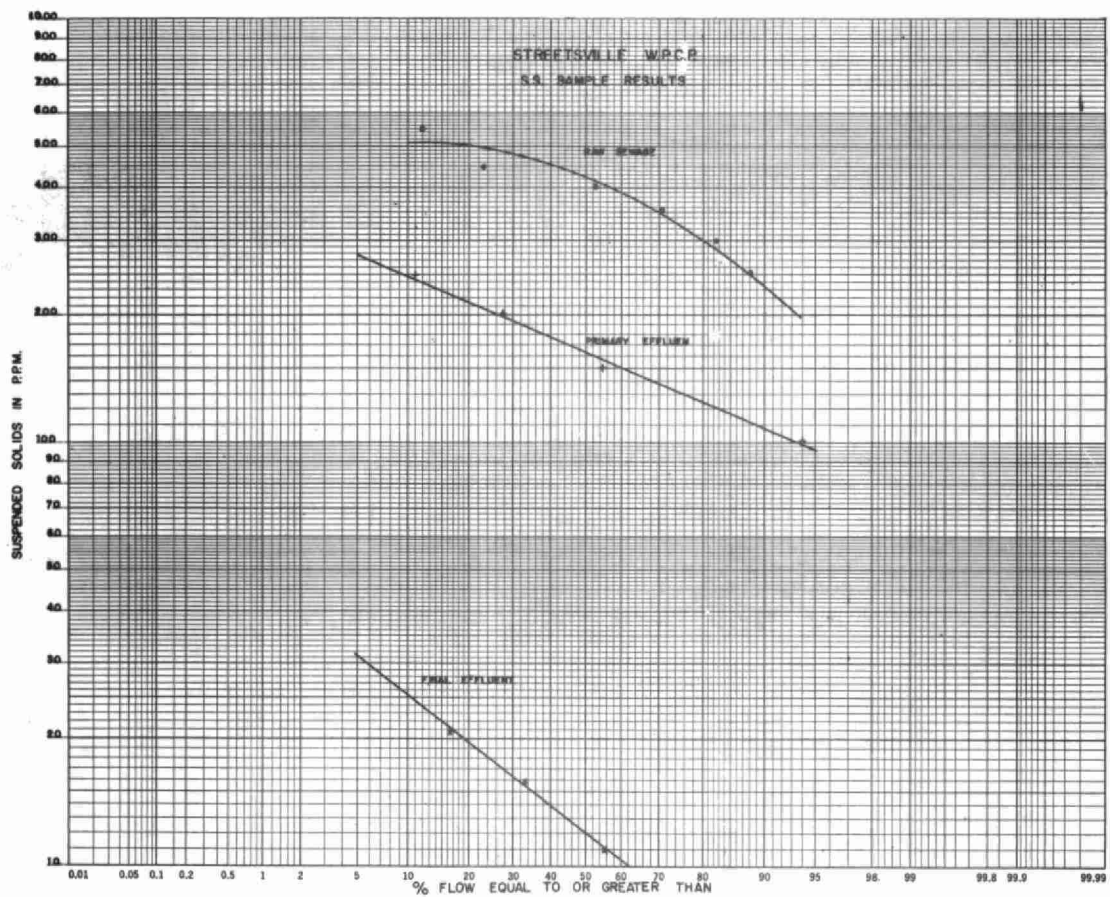
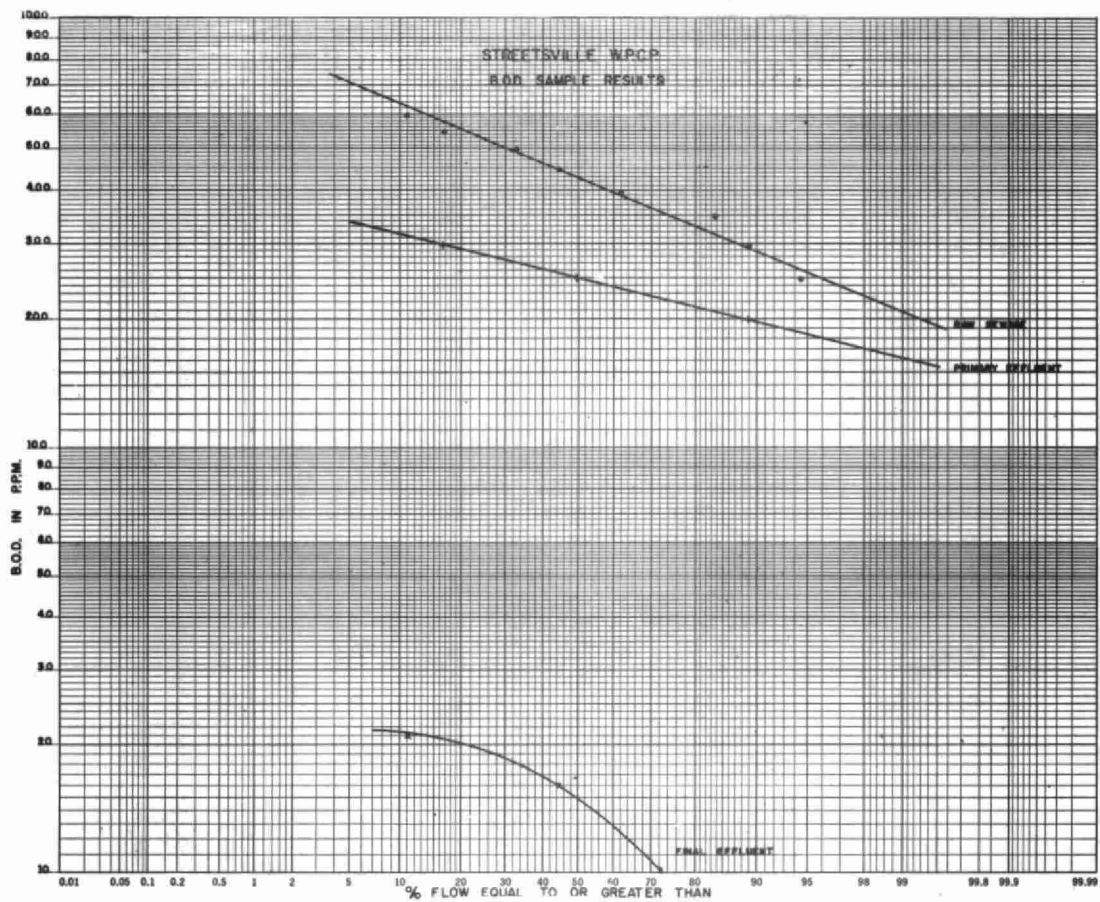
During 1963, a total of 140.6 million gallons of raw sewage was treated at the Streetsville plant. This is a decrease of 6% from that treated in 1962 and represents an average daily flow of 0.383 million gallons or 42% of the hydraulic capacity of the plant. The maximum twenty-four hour flow treated in 1963 occurred on June 8th when a flow of 0.895 million gallons was recorded.



Process Data







GRIT, B.O.D AND S.S. REMOVAL

MONTH	B. O. D.				S. S.				GRIT REMOVAL CU. FT.
	INFLUENT PPM.	EFFLUENT PPM.	% REDUCTION	TONS REMOVED	INFLUENT PPM.	EFFLUENT PPM.	% REDUCTION	TONS REMOVED	
JAN.	513	20	96.0	21.5	553	15	97.0	23.4	14
FEB.	-	-	-	-	-	-	-	-	11
MAR.	540	18	96.0	36.5	489	25	95.0	32.4	54
APR.	507	17	96.5	24.5	397	19	95.0	18.9	18
MAY	320	14	95.5	18.3	356	12	96.5	20.5	8
JUNE	380	15	96.0	20.9	404	20	95.0	22.0	31
JULY	530	4	99.0	30.7	451	9	98.0	25.8	6
AUG.	325	4	98.5	25.0	284	8	97.0	21.3	13
SEPT.	730	7	99.0	45.0	576	7	98.5	35.3	15
OCT.	460	17	96.5	26.0	423	2	99.5	26.5	34
NOV.	325	12	96.5	18.5	296	8	97.0	17.1	11
DEC.	390	11	97.0	22.4	441	10	97.5	25.4	12
TOTAL				315.6 *				292.8*	224
AVG.	456	13	97.1	26.3	425	12	97.1	24.4	19

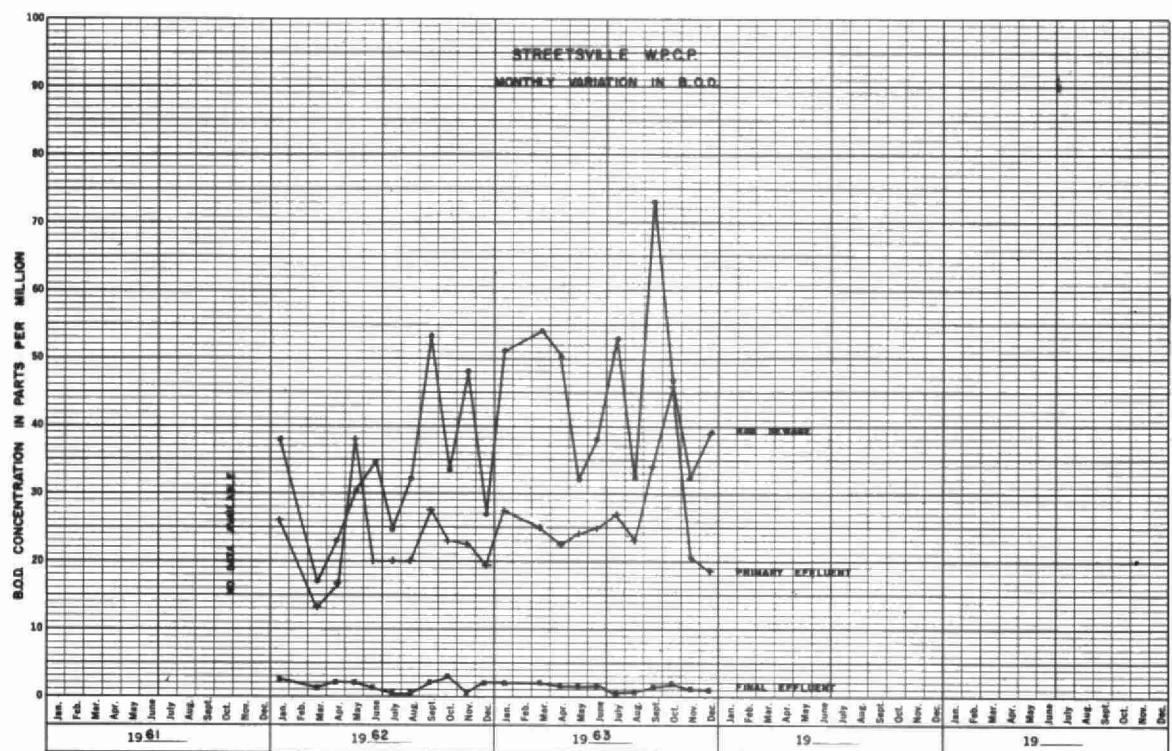
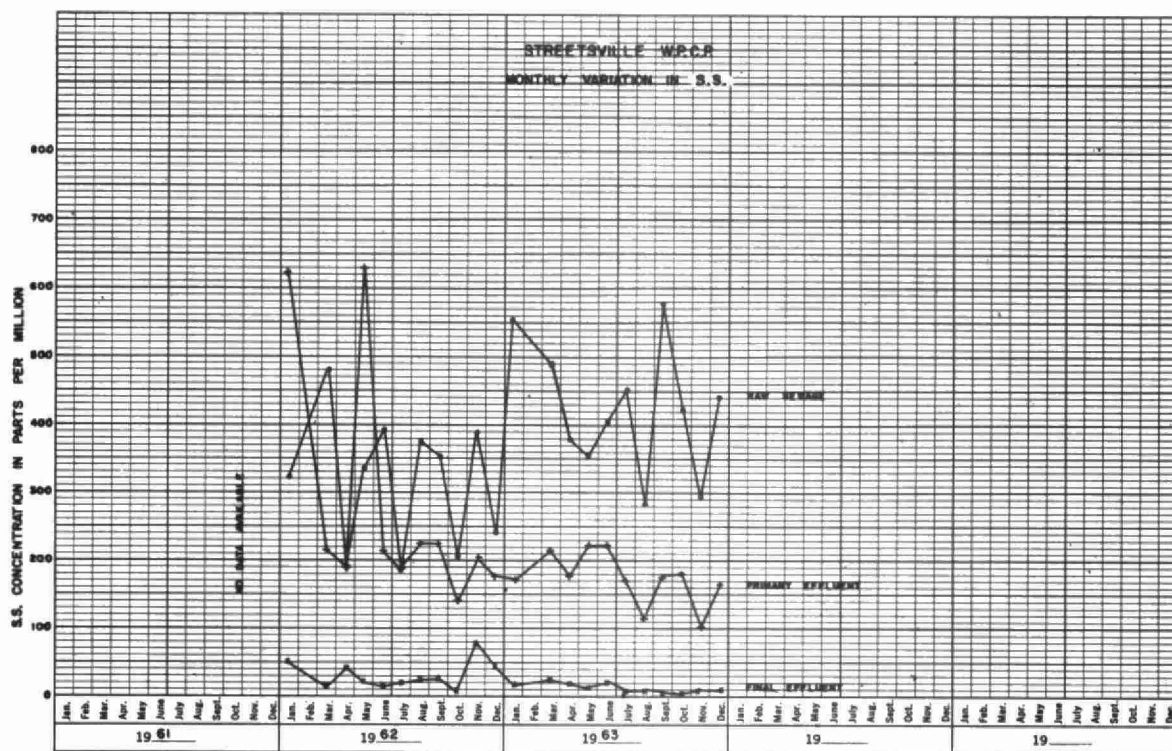
* Prorated.

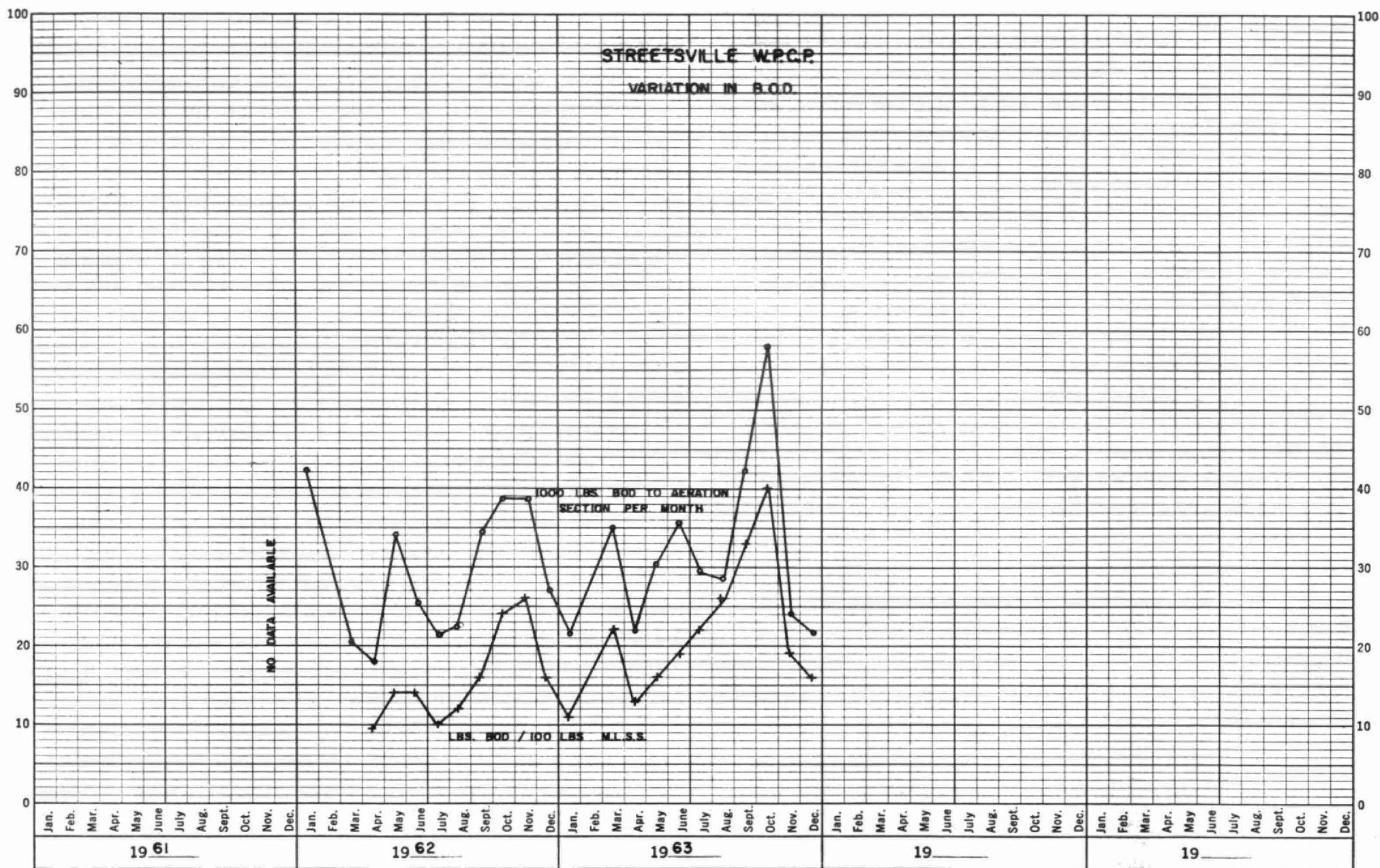
COMMENTS

An average loading of 456 PPM BOD and 425 PPM S.S. was observed in the raw sewage in 1963. The average BOD and S.S. in the effluent was 13 and 12 PPM respectively, both values being within the OWRC standard of 15 PPM for both BOD and S.S.

Both BOD and S.S. efficiencies obtained during 1963 were 97.1% of this plant. It should be remembered, however, that the plant was operated well below its hydraulic capacity and the efficiencies obtained will decrease with increasing flow.

The grit removed during 1963 was 224 cu. ft. or 1.6 cu. ft. per million gallons treated. This is average for a plant of this size and compares favourably with results from similar installations in North America.





AERATION SECTION

MONTH	PRIM. EFFL. B.O.D. PPM.	M.L.S.S. PPM.	LBS. BOD. PER 100 LBS. M. L. S. S.	CUBIC FEET AIR PER LB. B.O.D. REMOVED
JANUARY	275	2619	11	1959
FEBRUARY		2799	-	-
MARCH	250	2295	22	1354
APRIL	223	2266	13	1981
MAY	245	2179	16	1683
JUNE	250	1954	19	1500
JULY	270	1852	22	1401
AUGUST	230	1773	26	1374
SEPTEMBER	340	1760	33	1092
OCTOBER	450	1875	40	757
NOVEMBER	205	1596	19	1835
DECEMBER	185	1823	16	1986
TOTAL				
AVERAGE	266	2066	22	1538

COMMENTS

During the first half of 1963 operating problems were encountered in supernating to the primary clarifier. In order to overcome these problems a temporary line to the aeration tank was installed and satisfactory results were obtained. It is now proposed to install a permanent supernatant line to the aeration tank in 1964.

CHLORINATION

MONTH	PLANT FLOW (MG)	POUNDS CHLORINE	DOSAGE RATE (PPM)
JANUARY	8,714		
FEBRUARY	8,340		
MARCH	13,986		
APRIL	10,012		
MAY	11,970	185	2.0*
JUNE	11,454	451	4.0
JULY	11,714	504	4.3
AUGUST	15,459	390	2.5
SEPTEMBER	12,409	365	2.9
OCTOBER	12,646	535	4.2
NOVEMBER	11,839	265	3.0*
DECEMBER	11,816		
TOTAL	140,359	2695	
AVERAGE	11,697		

COMMENTS

Chlorination is required to lower the bacteria count of the effluent prior to its discharge to the Credit River.

During 1963 a total of 2695 pounds of chlorine were required during the period May 9th - November 26th. This represents an average dosage of approximately 3.6 PPM.

1963

PLANT

Total Operating Costs

MONTHLY

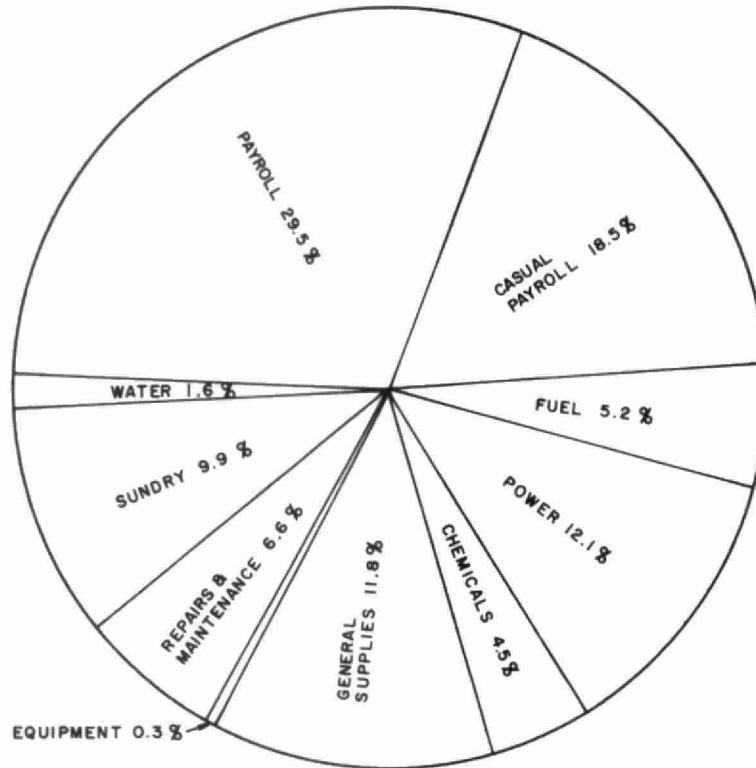
MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	SUNDRY	WATER
JAN	611.35	330.06	102.93	-	163.78	-	4.83	-	-	3.50	6.25
FEB	778.36	323.76	121.84	80.34	163.78	42.59	-	-	26.59	14.28	5.18
MARCH	812.65	323.76	116.84	48.42	170.70	43.18	16.68	-	-	85.23	7.84
APRIL	760.10	328.26	116.66	45.90	130.55	60.00	9.10	-	49.55	15.38	4.80
MAY	779.01	327.36	193.32	30.66	129.00	-	68.52	-	163.00	62.25	4.90
JUNE	949.69	305.76	202.76	33.66	146.86	-	11.06	-	168.12	65.35	15.12
JULY	2772.20	454.04	496.51	56.10	126.19	618.57	824.29	46.03	75.58	51.80	13.09
AUG	865.08	305.76	430.80	-	142.71	(350.00)	16.42	-	34.00	246.77	36.52
SEPT	1282.40	305.76	217.53	-	131.34	7.20	517.39	-	47.96	18.93	36.27
OCT	1191.37	305.76	213.48	-	136.16	44.58	24.63	-	195.41	240.93	30.42
NOV	1827.52	334.56	218.88	251.17	142.25	197.93	214.02	-	130.71	299.03	38.97
DEC	1468.07	564.84	201.37	192.95	143.77	-	(19.71)	-	52.40	302.48	29.97
TOTAL	14297.80	4219.68	2632.92	739.20	1726.89	664.05	1687.33	46.03	943.44	1406.93	231.33

PLANT

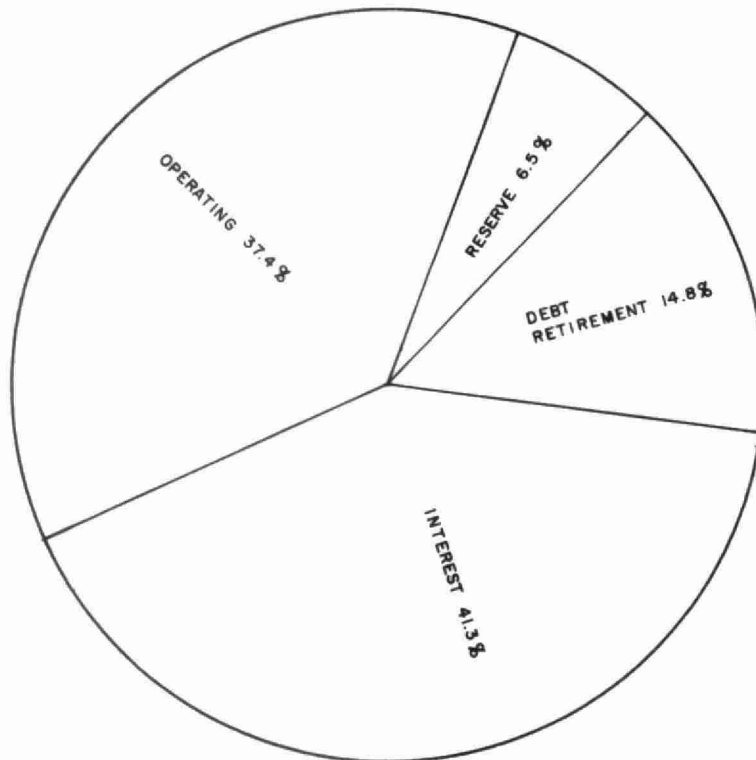
YEARLY

YEAR	M.G. TREATED	TOTAL COST	COST PER MILLION GALLONS	COST PER CAPITA PER YEAR
1961				
1962	148.7	\$11,416.75	\$77.30	\$2.20
1963	140.6	\$14,297.80	\$102.00	\$2.68

1963 OPERATING COSTS



TOTAL ANNUAL COSTS



SUMMARY

This report has given in detail the significant data on the operation of the various treatment units at the Streetsville Sewage Treatment Plant.

With an average flow of 0.4 million gallons per day in 1963, the flow was still below the design plant capacity of 0.8 million gallons per day. The average daily flows have not varied greatly from 1962.

It will be noticed that the final effluent quality is near to or less than the objective 15 parts per million BOD and suspended solids. This indicates satisfactory operation.

The total cost of operation was up considerably during 1963. This increase is due to three main factors:

- a) Haulage of liquid sludge due to greater efficiency of removal of BOD and suspended solids. This sludge could not be dewatered on the drying beds during the summer as this practice had caused odour complaints in the past.
- b) Higher repairs and maintenance costs due to aging equipment and more frequent breakdowns.
- c) Chemical costs increase due to extended chlorination of final effluent.

Under constant supervision by head office engineers, the plant staff has operated and maintained a clean, attractive plant for the Town of Streetsville.

LABORATORY LIBRARY



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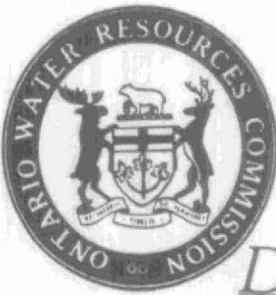
Total 1963 Costs

The total cost to the municipality during 1963 was as follows:

Operating.....	\$ 14,297.80
Debt Retirement.....	\$ 5,669.00
Reserve.....	\$ 2,495.00
Interest.....	<u>\$ 15,826.36</u>
TOTAL	<u>\$ 38,288.16</u>

Note: The amount in the Reserve for Contingencies Account as of December 31st, 1963 was \$ 14,114.91.





Division of Plant Operations

ONTARIO WATER RESOURCES COMMISSION
801 BAY ST. TORONTO 5